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CICATRICAL CONTRACTION FROM BURNS:

DEFORMITY OF FACE AND OF BOTH HANDS:

REPARATIVE OPERATIONS.

BY

ALFRED C. POST, M.D., LL.D.,

NEW YORK.

EXTRACTED FROM THE
TRANSACTIONS OF THE AMERICAN MEDICAL ASSOCIATION.



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CICATRICIAL CONTRACTION FROM BURNS: DEFORMITY OF FACE AND OF BOTH HANDS: REPARATIVE OPERATIONS.

J. W., born at Cutchogue, L. I., Dec. 25, 1876. On the 27th October, 1877, he fell over with a high chair to which he was tied. His face fell on the upper rim of a hot stove: the backs of both hands were brought into contact with the side of the stove, the commissure which joins the thumb and index finger of the right hand embracing a projecting bar of iron: the back of the left hand was burned much more severely than that of the right. Cicatrization was complete in about three months. Before the healing of the sores a number of pieces of bone were discharged from the left hand.

Nov. 6, 1878. The present condition of the child is as follows: General health good: mental and bodily development beyond the average: the right angle of the mouth is rounded, thickened, and indurated: a cicatricial ridge extends from the right commissure of the lips to the front of the chin, and obliquely upward and outward to the lobe of the ear, varying in breadth in different parts from half an inch to an inch.

Right Hand.—The thumb at its distal joint is acutely flexed and immovably bound down to the palm of the hand by very dense cicatricial tissue. There is complete luxation at this articulation. The distal phalanx of the index finger is subluxated outward at an angle of about 45° , and is quite immovable. The index and middle fingers are webbed together on their dorsal surfaces from the commissure to the articulation between the first and second phalanges. The web does not involve the palmar surface. There is free motion of all the articulations of the fingers, with the exception of the distal articulation of the index finger.

Left Hand.—The thumb and ring finger are substantially free from deformity, and enjoy perfect motion. The ring finger is slightly drawn back by a cicatricial band, which, however, does not interfere with its movements. The little finger is drawn obliquely backward and outward to an extreme degree by a dense mass of cicatricial tissue. The distal phalanx is slightly flexed, and there is a little perceptible motion. The index and middle fingers are much distorted, drawn backward, and immovably fixed. The index is dwarfed and thrown behind the medius. The distal end of the medius is bent backward. A very thick, hard cicatricial mass, in which the index, middle, and little fingers are imbedded, occupies half of the dorsal surface of the hand, which is drawn back on the forearm.

I began the treatment to-day (Nov. 6th), with an attempt to improve the condition of the right hand. I made a longitudinal incision on the dorsal surface of the index finger about three-fifths of an inch in length, extending over the distal extremity of the second phalanx and the proximal extremity of the third phalanx, dividing the skin, the extensor tendon, and the periosteum. I then carefully separated the periosteum from the bone, and with Liston's bone-forceps divided the bone of the second phalanx a quarter of an inch from its extremity, and removed the end of the bone. I also excised the cicatricial band by the contraction of which the end of the finger had been distorted. After this I was able to draw the end of the finger into its normal position; but it required some effort to hold it there. I then dissected up a triangular flap from the palm of the hand, the base of the triangle towards the articulation of the first phalanx of the thumb with the corresponding metacarpal bone, the apex towards the little finger, dividing the cicatricial mass on each side, but the thumb remained fixed, or was liberated to a very slight degree. I then excised the distal end of the first phalanx of the thumb in the same way in which I had operated on the index finger, and about to the same extent, after which I was able to bring the terminal phalanx of the thumb into a nearly straight position. I divided the web connecting the index and middle fingers, up to the commissure.

After waiting for the oozing of blood to cease, I brought together with sutures the wounds on the back of the index and of the thumb, and a part of the wound in the palm of the hand. I then applied a felt splint adapted to the dorsal surface

of the forearm, hand, thumb, and fingers, securing the different parts to the splint with adhesive strips and a bandage. The wound had previously been thoroughly washed with carbolic acid, 1 to 40. The distal end of the index was not as fully adducted as I had desired, nor was that of the thumb as fully extended, but there was a very marked improvement in the position of these parts.

7th. I found the patient in a very good condition, bright and playful. The dressings did not seem to have been in any degree disturbed or loosened.

The wound was dressed on the 8th and 10th, and afterwards daily, washing the parts freely at each dressing with carbolic acid, 1 to 40.

27th. The wounds have made favorable progress. Nitrate of silver has been applied to exuberant granulations as often as necessary. Passive motion has also been made from time to time. There has been an improvement in the position of the thumb and finger. The wounds are nearly healed. The interdigital space between the index and middle fingers has been maintained, as far as possible, by crowding strips of adhesive plaster up to the commissure during the healing process.

December 5th. The wounds are entirely healed. The interdigital space is not as perfect as immediately after the operation. The thumb is in a good position, but its motions are limited. The terminal phalanx of the index finger is nearly in a perfect position. The child is to go home into the country for a week or two. I gave directions to support the index with a splint in a straight position, and to apply passive motion freely to the thumb to increase its mobility.

19th. Patient has returned from the country in a good condition. To-day I performed the following operation on the left hand. I made a longitudinal incision on the dorsal aspect of the index finger, exposing the remains of the phalanges, and removing them, preserving the soft parts as a covering for the middle finger. I excised the principal part of the thickened and indurated cicatricial tissue which bound the middle finger to the back of the hand, and then brought the middle finger forward into a moderately flexed position. As a large portion of the dorsal surface was destitute of integument, I covered it in part with the skin removed from the index, securing it in place with fine sutures. I also divided the dense cicatricial

bands confining the little finger in its abnormal position, and brought it into a state of moderate flexion. A considerable denuded surface was left on the back of the hand, and on the dorsal surface of the little finger, to heal by granulation and cicatrization. As the first phalanx of the middle finger was bent backward, the second phalanx forward, and the last phalanx backward, and immovably fixed in that position, I excised the distal extremity of the second phalanx, and was thus enabled to bring the part into a better position. I secured the palmar surface of the forearm and hand to a stiffened felt splint, with digital prolongations for the middle, ring, and little fingers, which were secured to the splint in a moderately bent position. The middle and little fingers could not be brought into perfect shape, and much was necessarily left to be accomplished by subsequent treatment.

25th. For several days past, I have applied caustic potassa to the raw surface of the inodular tissue covering the dorsal aspect of the first phalanx of the little finger, reducing the thickness of the indurated mass. To-day I removed the sutures connecting the flap taken from the index finger with the dorsal portion of the middle finger. The flap retains its vitality throughout, and is adherent to the subjacent parts at the proximal extremity, but not at the distal end. The exposed surface on the back of the hand is granulating, and presents a healthy appearance. The dressings are renewed daily, the parts are freely washed with the carbolic lotion, and passive motion is applied.

January 20, 1879. The application of caustic potassa was continued only a few days after the last report, but a slight application of nitrate of silver was made daily until three days ago, since which time it has not been required. For the last fortnight, the three fingers of the left hand have been drawn together with adhesive plasters, and have been secured to a bent splint by adhesive plasters and bandages. The dorsal surface of the little finger is entirely covered with integument, and that of the middle finger nearly so. The granulating surface on the back of the hand is greatly reduced in size, and presents a healthy appearance. I determined to-day to leave the parts undisturbed for forty-eight hours, intending hereafter to dress the wound at intervals of two days.

February 13th. The wound is entirely healed. The little finger is in an extended position, but can be flexed to a moderate

degree at the metacarpo-phalangeal articulation, and very slightly at the other articulations. The middle finger is shorter than the ring finger, and nearly double its breadth. Its distal phalanx is bent outward toward the thumb. Near the distal extremity, there is a slight separation between it and the integument transplanted from the index. To-day I performed the following operation: I exposed the terminal phalanx of the middle finger by an incision on its dorsal surface, and divided it with bone forceps, removing more than a quarter of an inch of its proximal extremity. I also removed a longitudinal strip of integument from the dorsal surface of the finger, about a quarter of an inch in breadth, including the edges of the cleft near the extremity of the finger. The edges of the incisions, after being washed with the carbolic lotion, were then brought together with sutures. I then dissected up a triangular flap of integument from the dorsal surface of the forearm near the wrist, the base of the flap extending on each side of the cicatrix on the back of the hand, the apex about three and a half inches upon the forearm. Bending the hand upon the forearm, the apex of the flap was drawn down about two inches, and the sides of the chasm thus produced were united transversely by pin sutures. The sides of the flap were then united with the outer edges of the wound by pin and thread sutures, fortified by strips of adhesive plaster, and the forearm and hand were secured by their palmar surface to a bent splint. The object of the triangular flap was to diminish the tendency to subsequent retraction of the hand backward on the forearm.

After completing the operation, as above described, on the left hand, I performed an operation on the right hand, to give more liberty of motion to the thumb in a backward and outward direction. Finding that it was attached to the palm of the hand by a broad and thick band of cicatricial tissue, which prevented full extension and abduction, I divided this band by four parallel incisions extending through its whole thickness. Cloths wet with a carbolic lotion were then applied, and kept in place by a bandage, reserving the use of a splint for a subsequent dressing.

14th. I applied a felt splint to the dorsal surface of the forearm and hand, fixing the thumb in an extended and abducted position. I also dressed the left hand, finding the wounds in a satisfactory condition.

15th. Removed all the pin and thread sutures from the left forearm and hand. The edges of the wound on the forearm from which the flap had been taken remained in contact, and were secured by adhesive strips. The edges of the flap receded a little, but were kept in place by strips of adhesive plaster. There was a little suppuration, but the general appearance of the parts involved in the operation was favorable.

28th. The wounds at the junction of the right thumb with the palm of the hand are entirely healed. I deem it expedient to keep the parts still on the stretch. The wound on the middle finger of the left hand is healed. Its extremity is still bent outwards, and is fixed in that position. The wound on the back of the hand is nearly healed, and there is considerable liberty of motion at the wrist-joint.

March 10th. The wounds are all healed.

21st. The patient being etherized, I performed the following operations:—

I. I dissected out an additional portion of the superfluous integument on the outer side of the middle finger of the left hand. I then incised the periosteum over the second phalanx, and with cutting forceps removed an additional portion of that bone, overcoming the curvature of the end of the finger, which I secured to a splint in a straight position.

II. I divided the web uniting the upper part of the space between the first phalanx of the index and the first phalanx of the medius of the right hand. I divided this web nearer to the middle finger than to the index, and, to gain additional space, dissected a triangular flap with its base extending on each side of the web, and its apex extending up on the dorsum of the hand. I was able then to bring the edges of the integument together with sutures on the ulnar side of the index. Strips of adhesive plaster were also applied around the index, and others around the medius from the commissure downward.

III. I dissected out a cicatricial band on the face, which drew downward the right angle of the mouth; and I then elevated the right extremity of the vermilion border of the lower lip, and secured it by a pin suture to a raw surface prepared for it at the junction of the right extremity of the upper lip with the cheek. The vacant space thus left below the right angle of the mouth was closed by a horizontal flap dissected from the

lower lip a little below the vermilion border and attached to the adjacent parts with fine sutures.

23d. I dressed all the wounds of the hands and face, removing all the sutures excepting those immediately below the vermilion border of the lip. These were so imbedded in dried blood that I could not remove them without disturbing the process of adhesion. Union has taken place, except at one point below the angle of the mouth. I applied over the wound of the face a number of linen threads moistened with collodion. The wounds of the hands were dressed with adhesive plasters and bandages.

25th. The wound of the face has not been disturbed since the collodion was applied, day before yesterday. The wounds of the hands were dressed yesterday and to-day; they were doing well, except that on the dorsal surface of the left hand there has been sloughing of the old cicatrix near the lower extremity of the metacarpal bone of the middle finger, over a space of about half an inch in diameter. This has perhaps been due to the pressure of a felt splint. To-day I left off the splint, securing the middle finger by adhesive strips to the ring finger.

27th. The collodion dressings on the face, having become loose, were removed; the remaining sutures also were taken out. The wound on the face was supported by strips of India-rubber adhesive plaster.

April 17th. The wounds made at the last operation have all healed. The middle finger of the left hand is much reduced in size; it is somewhat shorter than the little finger, and it is nearly straight. The space between the index and middle finger of the right hand is restored, there being scarcely a trace of the web which united them. The deformity of the right angle of the mouth is almost entirely overcome. But the vermilion border of the lower lip in that vicinity is thicker than toward the opposite commissure. To relieve this deformity I dissected out a wedge-shaped portion of the vermilion border and united the edges of the wound with three fine sutures. The right thumb also being still bound with cicatricial bands so as to prevent it from being freely abducted and extended, I divided these bands by three parallel incisions, and secured the thumb to a splint in a position of forced abduction and extension. The splint was applied to the radial edge of the forearm, and was bent so as to adapt it to the posterior and external surface of the

thumb. It was composed of two layers, felt next to the limb, malleable iron outside.

19th. I removed the splint from the right thumb, and found the wound in a good condition. Reapplied the splint as before.

21st. Removed the sutures from the lip. The wound has united, and the lip presents an improved appearance.

The results obtained from the treatment of the complicated deformities of the face and hands in this patient fall far short of a perfect restoration of the deformed parts to their normal shape. But considering the extent of the deformities, and the difficulties to be overcome, I regard the result as eminently satisfactory. The disfigurement of the face, which was moderate in degree, has been in a great measure removed. The right hand has been greatly improved in its shape by liberating the thumb from its imprisoned condition, by restoring the interdigital space between the index and middle fingers, and by greatly diminishing the extent of the abduction of the terminal phalanx of the index finger. A glance at the drawings showing the appearance of this hand before and after the treatment will suffice to show the improvement which has taken place.

But the principal triumph of surgery in the treatment of this case is exhibited in the change in the conformation of the left hand. Before the treatment, this hand presented an almost perfect thumb and ring finger, while the other parts entering into its structure were drawn into a confused and shapeless mass in which the three remaining fingers were blended together, so as to require a careful dissection to separate them from each other and from the mass of cicatricial tissue in which they were enveloped. The hand, as a whole, was drawn forcibly back upon the forearm, and firmly fixed in that position by the dense cicatricial mass in which the fingers were imbedded. As a result of the treatment, the hand is brought down to its proper position in the same plane as the forearm, and is capable of being flexed and extended by the voluntary action of the muscles. The little finger occupies its proper place by the side of the ring finger in an extended position, but its motions are as yet quite limited. There is reason to hope that by the persevering use of passive motion there may be a considerable improvement in the degree of mobility. The middle finger is greatly reduced in length, but occupies its proper place on the radial side of the ring finger. The thumb and ring finger retain their perfect form and mo-

bility, as before the commencement of the treatment. The hand is very far from being perfect, the index finger having been removed, and the middle finger much shortened, but the remaining parts of the hand are in their proper relations to each other, and the hand as a whole is far from presenting the shapeless and unsightly mass which it did before the treatment.

The following wood-cuts will assist the reader in obtaining a correct idea of the character of the deformities, of some of the steps in the operations which were performed, and of the degree in which the several deformities were relieved by the treatment.

Fig. 1.



Fig. 1 is copied from a photograph, representing the deformity about the right angle of the mouth. Fig. 2 is copied from a photograph exhibiting the same parts after the treatment.

Fig. 3 is copied from a drawing, exhibiting the palmar aspect of the right hand before treatment. An unsuccessful attempt had been made to secure a photograph of this hand before the operation. Fig. 4 is copied from a drawing representing the dorsal aspect of the same hand before the operation of March 21st, 1879, exhibiting the web which joined the index and middle fingers, and the triangular flap which was cut on the dorsum

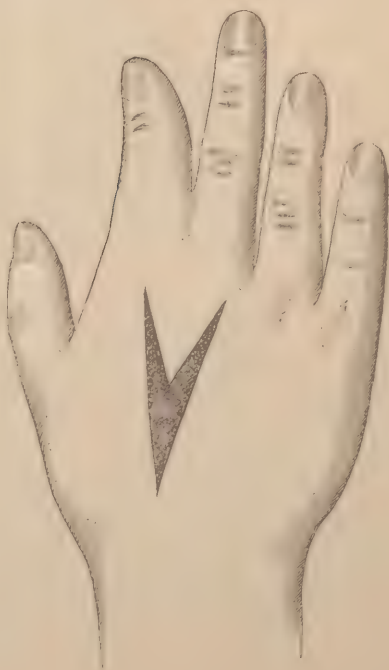
Fig. 2.



Fig. 3.



Fig. 4.



of the hand to diminish the tension of the parts in that region, so as to facilitate the healing of the integument on the opposed sides of the fingers, after the division of the web.

Fig. 5 is copied from a photograph exhibiting the appearance of a plaster cast of the palmar aspect of the right hand at the close of the treatment.

Fig. 5.



Fig. 6.



Fig. 6 is copied from a photograph exhibiting the appearance of a plaster cast of the radial aspect of the left hand, in its deformed condition, before the treatment. The thumb and the ring finger are conspicuous at the upper part, and are free from deformity. The middle finger, shortened and curved, is placed behind the ring finger. The index finger is drawn upward and backward behind the middle finger, and beyond its terminal phalanx is seen the tip of the dorsal surface of the little finger. The hand, as a whole, is seen to be drawn forcibly upward and backward upon the forearm.

Fig. 7 represents the left hand as seen from its ulnar side. The little finger is seen deeply imbedded in cicatricial tissue, leaving only its distal extremity free. The middle finger is seen behind the ring finger, and between it and the little finger appears a small portion of the tip of the index finger.

Fig. 8 is copied from a drawing, giving a general idea of the

Fig. 7.



Fig. 8.



appearance of the dorsal surface of the left hand before the operation which was performed on the 13th of February, 1879. The principal objects of interest, as exhibited in this figure, are the great bulk of the reconstructed middle finger, and the triangular flap which was dissected from the dorsal surface of the forearm and hand to relieve the tension in that region, and to give greater freedom of motion to the wrist.

Fig. 9.

Fig. 9 is copied from a photograph of a cast representing the dorsal aspect of the left hand at the close of the treatment. The apparent distortion of the thumb is the result of the struggles of the child while the cast was being taken. The thumb itself is entirely free from deformity, and its mobility is unimpaired.



